

541, 243

Rec'd PCT/PTO 01 JUL 2005

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau(43) International Publication Date  
22 July 2004 (22.07.2004)

PCT

(10) International Publication Number  
WO 2004/062087 A1(51) International Patent Classification<sup>7</sup>: H03D 7/16,  
H04B 1/04N2K 3W4 (CA). SNYDER, Christopher, Eugene  
[CA/CA]; 618 South Haven Drive, Waterloo, Ontario N2K  
4M2 (CA).(21) International Application Number:  
PCT/CA2004/000014(74) Agents: LEDWELL, Kent, M. et al.; Gowling Lafleur  
Henderson LLP, 160 Elgin Street, Suite 2600, Ottawa, On-  
tario K1P 1C3 (CA).

(22) International Filing Date: 6 January 2004 (06.01.2004)

(25) Filing Language: English

(26) Publication Language: English

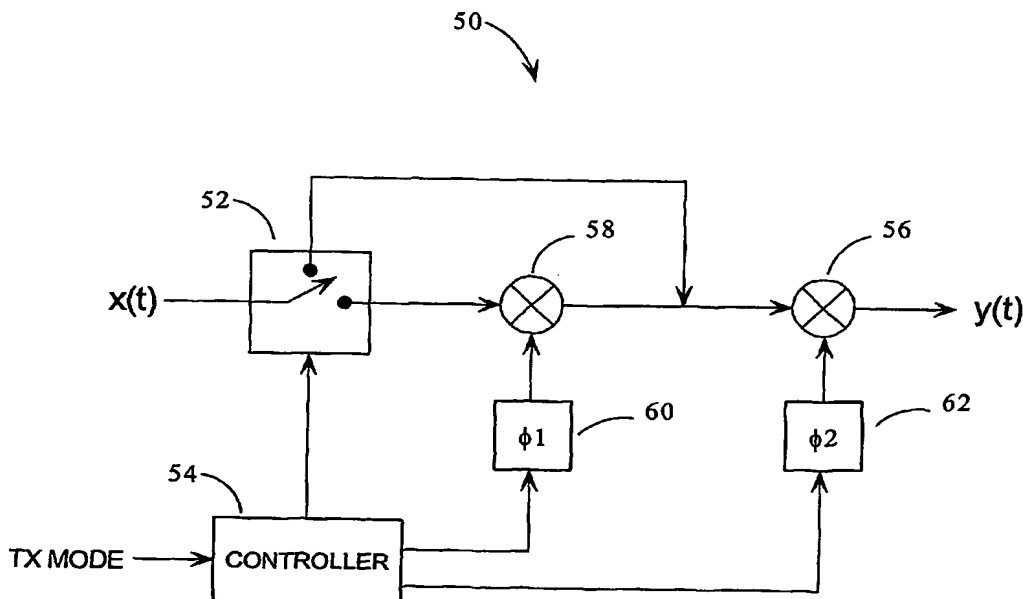
(30) Priority Data:  
2,415,668 6 January 2003 (06.01.2003) CA  
60/438,202 6 January 2003 (06.01.2003) US(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.(71) Applicant (for all designated States except US): SIRIFIC  
WIRELESS CORPORATION [CA/CA]; 460 Phillip  
Street, Waterloo, Ontario N2L 5J2 (CA).

(72) Inventors; and

(75) Inventors/Applicants (for US only): KUNG, William  
[CA/CA]; 185 Shadow Wood Court, Waterloo, Ontario(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-  
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,

[Continued on next page]

(54) Title: MULTI-MODE MODULATOR AND TRANSMITTER



(57) Abstract: The present invention relates generally to communications, and more specifically to a method and apparatus of modulating baseband and RF (radio frequency) signals. A modulator topology is disclosed in which an input signal  $x(t)$  is up-converted to an output signal  $y(t)$ , either by mixing it with two mixing signals  $\phi 1$  and  $\phi 2$  ("pseudo-direct conversion" mode), or by mixing it with only one mixing signal  $\phi 2$  ("direct-conversion" mode). In pseudo-direct modulation mode, the  $\phi 1$  and  $\phi 2$  mixing signals emulate a local oscillator signal; the product  $\phi 1 * \phi 2$  has significant power at the frequency of a local oscillator signal being emulated, but neither  $\phi 1$  nor  $\phi 2$  have significant power at the frequency of the input signal  $x(t)$ , the LO signal being emulated, or the output signal  $\phi 1 \phi 2 x(t)$ .

WO 2004/062087 A1